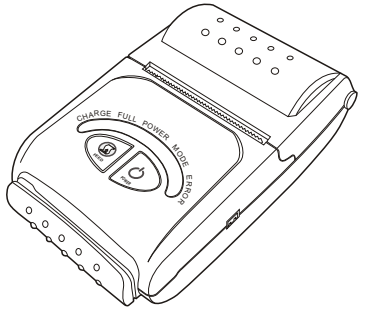


AB-320M
AB-330M

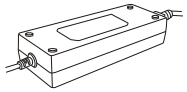
Mobile Printer
USER'S MANUAL

MANUAL REVISION EN8.1

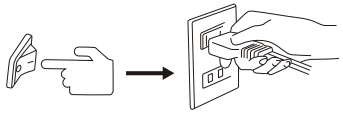
Zonerich Computer Equipments Co., Ltd.
http://www.zonerich.com

NOTICE

You must use only the supplied charger. It is dangerous to use other chargers.



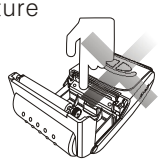
Make sure the printer power is off before plug or unplug the cable.



Please don`t place the printer in humidity or dusty space, excessive humidity and dust may damage it.

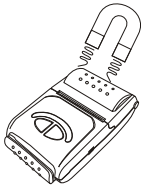
Do not put foods or drinks on the printer, in case that splash into the printer.

The print head has a high temperature after work. Please don`t touch the print head or touch the motor shell in case scalded.



Do not plug or unplug with your hands wet. You may be electrocuted.

Keep magnetic objects away from the printer.



Don't make battery short circuit or heated. Otherwise the battery may be damaged or cause fire or explode.

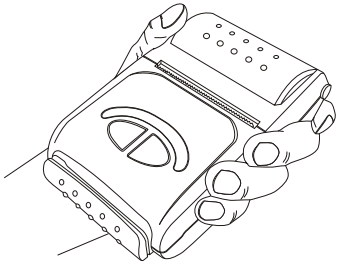
INTRODUCTION

AB-320M/AB-330M is the mobile printer model with excellent performance. It is integrated with Serial, USB and Bluetooth interfaces. It can be easily used for forms or receipts printing cooperated with portable equipments, such as PDA, Laptop, Data Samplers etc.

The main features of the printer are as follows:

1. High speed printing: 60mm per second max.
2. Low noise thermal printing.
3. RS-232, USB, Bluetooth interfaces integrated.
4. The data buffer allows the unit to receive print data even during printing.
5. Bar code printing is possible by using a bar code command.

Please do read the instructions in this manual carefully before using your new AB-320M/AB-330M



⚠ WARNING

Some semiconductor devices are easily damaged by static electricity. In order to guard the printer against the static electricity , you should turn the printer "OFF", before you connect or remove the cables on the face side. If the printer is damaged by the static electricity, you should turn the printer "OFF".

All specifications are subjected to change without notice.

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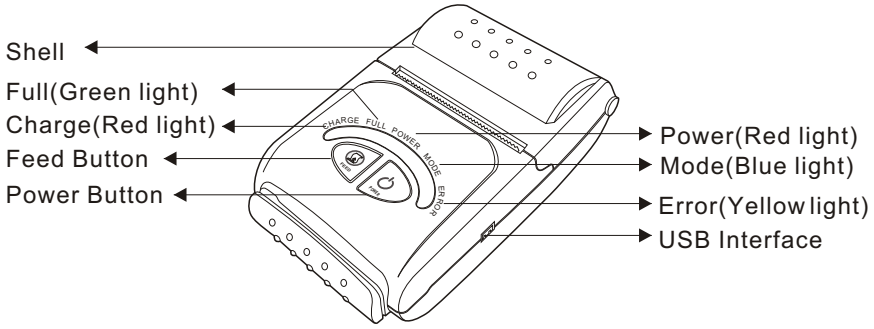
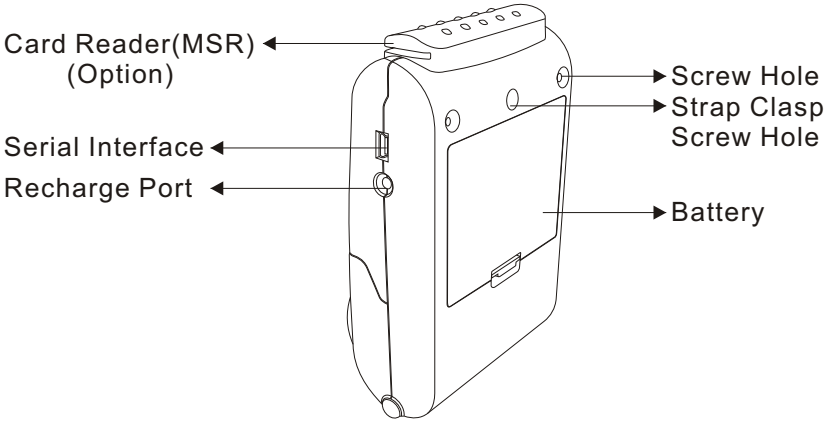
Chapter 1 Overview

Below pictures define every part of printer model AB-320M/AB-320M.

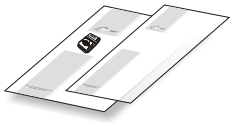


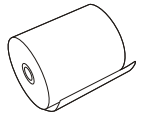


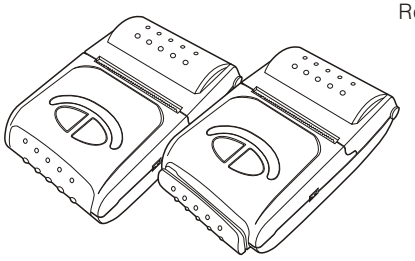
Chapter 2 Setting up the Printer

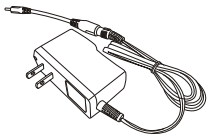
2-1. Unpacking

Your printer box should include these items. If any of the items was damaged or missing, please contact your dealer for assistance.

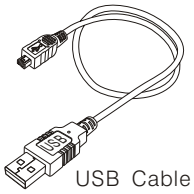

Operator's Manual


Roll paper

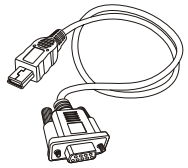

AB-320M/AB-330M


Recharger

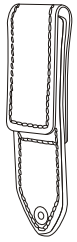
Printer Bag

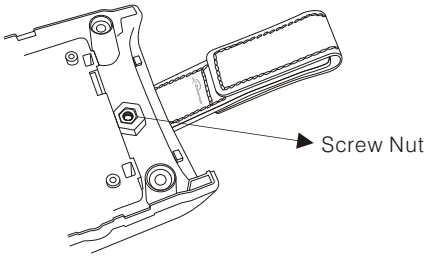


USB Cable


Serial Cable

Below strap clasp is not included in the box but optional. The strap clasp is fixed on the back shell of the printer using a nut inside and right behind the back shell.


Strap Clasp



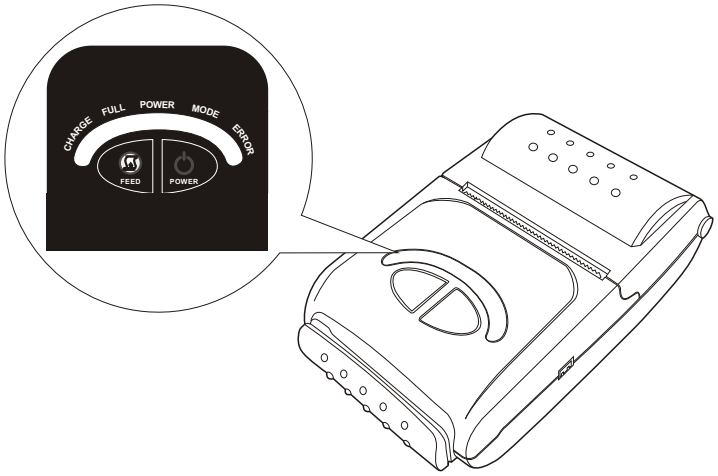
2-2. Using the Printer

BUTTON

- FEED
  Press the FEED button once to advance paper one line. You can also hold down the FEED button to feed paper continuously.
- POWER
  Press this button and hold on for a few second, the printer can be powered on/off.

PANEL LIGHTS

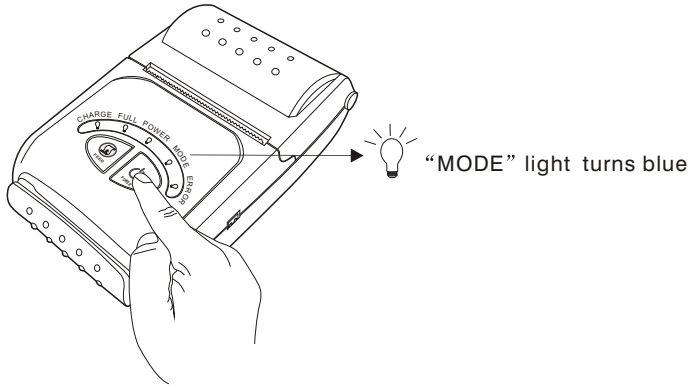
- CHARGE
  When the printer is connected with the charger, this light turns RED.
- FULL
  When the battery finished recharging, this light turns Green.
- POWER
  On-working indicator.
- MODE
  In mode-setting statue,it turns BLUE.
- ERROR
  Error appears,the light turns Yellow.



BAUDRATE SETTING(For example:Set 9600BPS baudrate)

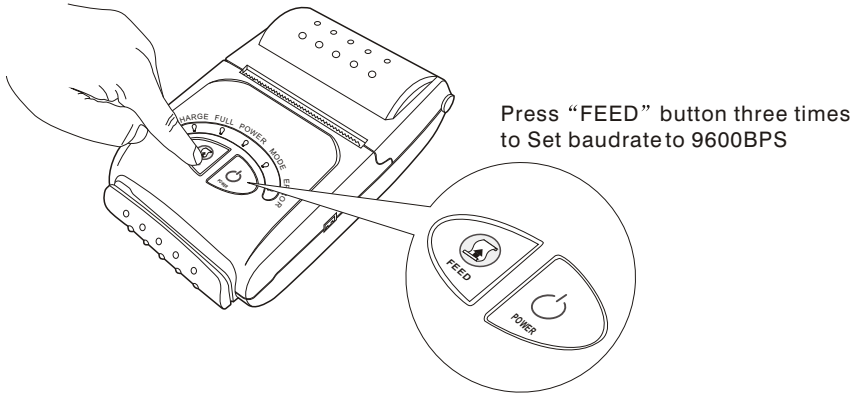
Before setting baudrate,make sure the printer is on "off" Status.

1. Press "POWER" button and hold on till "MODE" light turns blue.



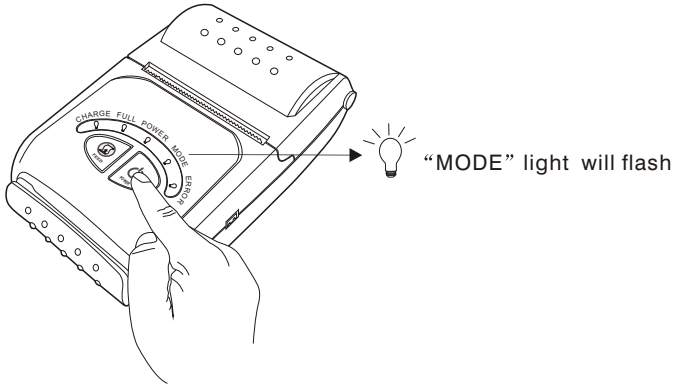
2. Press "POWER" button one time again.the "MODE" light will flash.

3. Press "FEED" button to Set baudrate.Press "FEED" button three times. Press "FEED" one time is 2400BPS,Press two times is 4800BPS,Press three times is 9600BPS.Once press "FEED" button one more time the baudrate will be increased as below.



Press “FEED” button	Baudrate
One time	2400BPS
Two times	4800BPS
Three times	9600BPS
Four times	19200BPS
Five times	38400BPS
Six times	57600BPS
Seven times	115200BPS

4.Press “POWER” button again to confirm baudrate Setting.The “MODE” light will flash one or several times.Flash times is the Same as the times you press the “FEED” button.

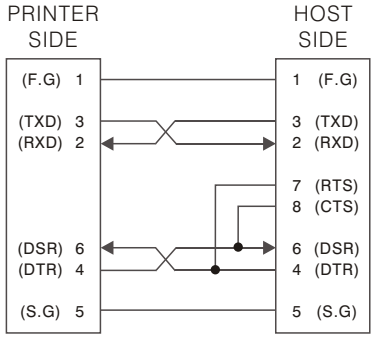


Chapter 3 Interfaces and cable connection

3-1. Interfaces

This mobile printer model has three interfaces: RS232, USB and Bluetooth. Below are the specifications.

3-1-1. RS-232C Cable Connection



Interface Connector
Serial Interface (RS-232)

Pin No.	Signal name	Direction	Function
1	FG	-	Frame Ground
3	TxD	Output	Transmit Data
2	RxD	Input	Receive Data
7	RTS	Output	Ready To Send
8	CTS	Input	Clear To Send
6	DSR	Input	Date Set Ready
5	SG	-	Signal Ground
4	DTR	Output	Data Terminal Ready

3-1-2. USB Connection

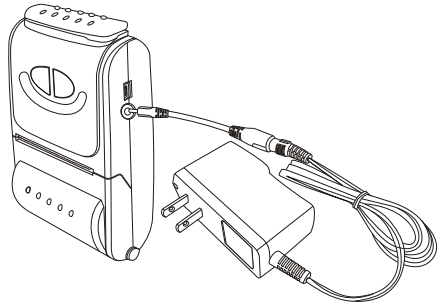
Pin No	Signal name	Direction
1	VCC	+ 5V DC
2	D-	Data -
3	D+	Data +
4	GND	Ground

3-1-3. Bluetooth

As a global open standard, Bluetooth is an excellent wireless data comunication technology. There is no need for bluetooth equipments to transfer data of strict poistion and that differs from IrDA.It supports not only point to point but also point to multipoints(Seven points for max). This model is compatible with Bluetooth 2.0 standard and with power level of Class 2. The original password of this model is " 1234" . While printing, the host and printer should be of distance less than 10 meters. If there is any obstacle or EMI between host and printer, distance of less than 5 meters is required.

3-2. Connect the cables

3-2-1. Connect the AC recharger to the printer to recharge the battery

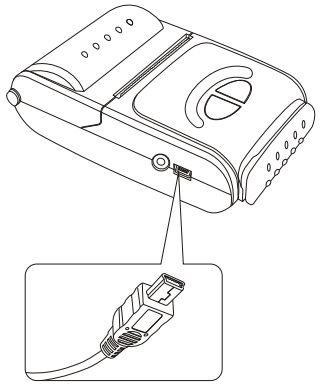


NOTE:To remove the DC cable connector, make sure that the power supply`s power cord is unplugged; then grasp the connector and pull it out straightly .

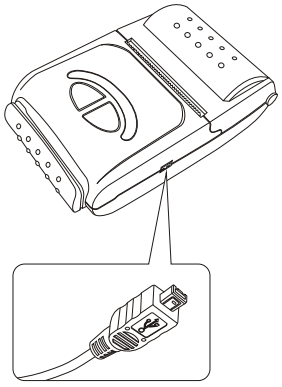
3-2-2. Connect the RS-232 port or USB port

Connect the Host Computer (POS/ECR) to the priter using an interface cable that matches the specifications of the printer and the Host computer (POS/ECR).

1). Turn off both the printer and the Host computer (POS/ECR).
2). Plug the interface cable connector into the printer's interface connector.
3). Plug the other cable head into the Host computer(POS/ECR).
4). Turn on the Printer and Host computer(POS/ECR).



RS-232

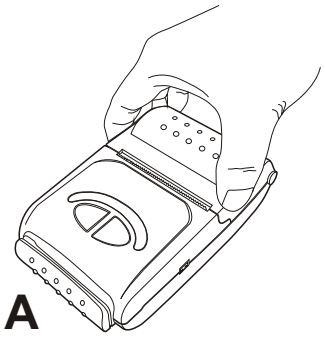


USB

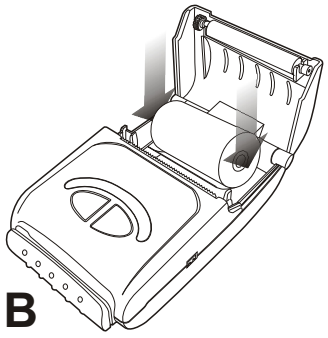
Chapter 4 Roll paper installing

4-1. Installing or Replacing the Roll Paper

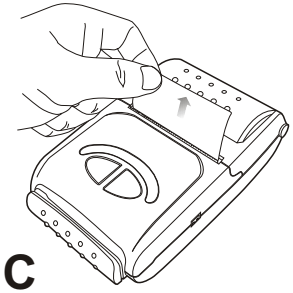
1. Make sure that the printer is not receiving data; otherwise, data may be lost.
2. Grasp the two sides of the paper cabin cover and pull till the cover open.
3. Remove the used paper roll core if there is any.
4. Put in a new paper roll as shown.
5. Be sure the correct direction of the paper comes off the roll.
6. Pull out a small amount of paper, then close the cover. As picture shows.



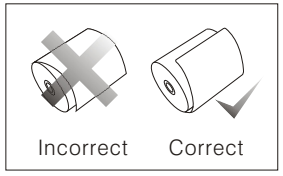
A



B



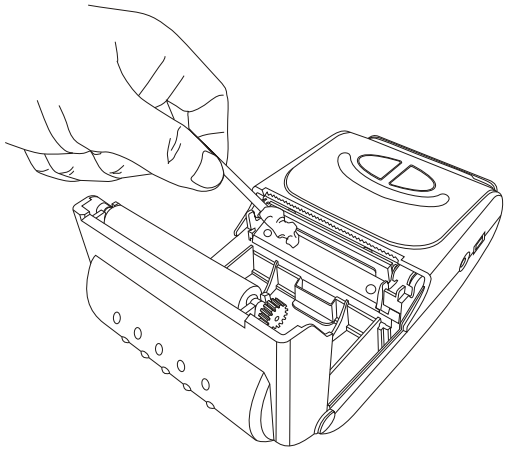
C



D

4-2. Cleaning the Print Head

Turn off the printer, open the paper roll cover, and clean the thermal elements of the print head with a cotton swab moistened with an alcohol solvent (ethanol, methanol, or IPA).
Recommend to clean the thermal head periodically (generally every three months) to maintain receipt print quality.



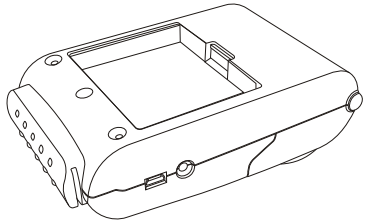
NOTE: After printing, the print head can be very hot. Be careful not to touch it and to let it cool before you clean it. Do not damage the print head by touching it with your fingers or any other hard object.

Chapter 5 Battery installation

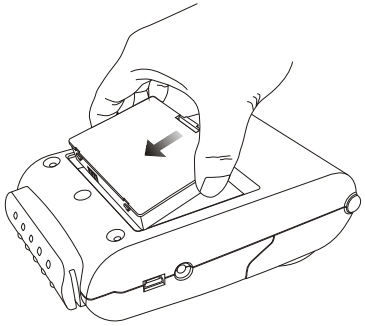
The mobile printer is battery power supplied. Battery should be fully recharged and properly installed in the printer before using.

Follow the picture steps as below:

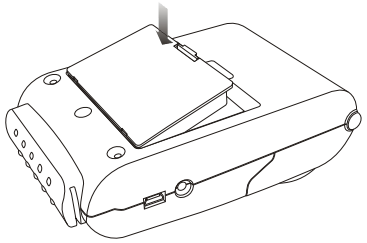
1. invert the printer to the back battery cabin.
2. put the battery in the printer battery cabin in right position.
3. press the battery till a voice from the button.



A



B



C

Chapter 6 Self test

Self test checks whether the printer can perform normally or not, except to functions of communication and recharging.

Follow the steps to initial a self test:

1. Make sure paper roll has been installed properly,
2. Press on the FEED button and hold on the POWER button for more than 3 seconds, then the self test performs.
3. The printer is ready to receive data after it fininshed the self test.

Chapter 7 Basic operations

7-1. Power on/off

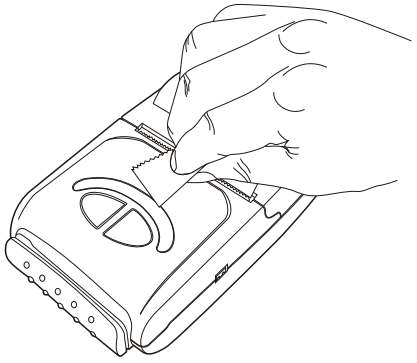
Press on the POWER button and hold on for more than 3 seconds. The printer will be powered on if the pre-statue is off; and the priner will be powered off if the pre-statue is on.
Be sure the printer is powered on before printing. If the printer will not be used for a long time, do please power it off to save battery power.

7-2. Feed paper

This printer can feed paper manually.
Press the FEED button once to advance paper one line. Press the FEED button and hold on to feed paper continuously.

7-3. Tear paper

After finished printing every receipt, users need to tear off the receipt by themselves. There is a sawtooth architecture for tearing. Pay special notice to tearing angle and force , over force may results in roll paper being pulled out from the paper cabin.



Chapter 8 Alarming to lack of paper

This printer can detect paper lacking.
When the printer run out of paper, the ERROR indicator light will turn yellow. If the paper runs over when printing, the data in the printer buffer won't be cleaned. The printing will go on after the paper loaded.

Chapter 9 Using and recharging battery

The mobile printer is power supplied by rechargeable Lithium-Ion battery. As the battery can be easily damaged, the usage of battery affects the battery's life span. Please use the battery properly under below instructions.

1. If the printer is not used for a long time (usually more than one week), do please fetch out the battery for separate storage and better to fully recharge the battery before fetching out the battery.
2. Power off the printer to save battery power after finished using.
3. When battery running over, the power indicator light would flash for alarming. The printer can still work for an uncertain time, but users should recharge the battery to ensure that the printer work properly.

Follow the below operations:

1. Plug the recharger into an outlet and plug the other terminal to the printer.
2. While recharging, the indicator light turns red. After recharge, the indicator light turns green.
3. Please don't use the printer while recharging, otherwise the battery's life span would be decreased.

Chapter 10 Specifications

		AB-320M		AB-330M
Printing		Direct thermal line printing		
Paper Supply Method		Easy Paper Loading		
Characters Per Line		Font A:48CPL,Font B:64CPL		
Character Size		Font A:12x24dots,Font B:9x24Dots		
Resolution		203dpi, 8dots/mm		
Print Width		48mm		72mm
Printing Speed		60mm/sec		
Cutter Type		Manual Tearing		
Paper Type		Thermal Paper		
Paper Diameter		40mm		
Paper Width		58mm		80mm
Receive Buffer Size		16k bits		
Interface		Serial, USB, Bluetooth		
Barcodes		1D:Codebar,ITF,UPC-A,UPC-E,CODE 39,CODE93, CODE128,EAN-8,EAN-13		
		2D:QR CODE,PDF417		
Battery	Battery Type	Lithium-Ion		
	Output	DC7.4V		
	Capacity	1100mAh		
Battery Charger	Input	AC100~240V 50/60Hz 0.5A		
	Output	DC9V 1A		
Operating Temperature		0 ℃~50 ℃		
Storage Temperature		10 ℃~70 ℃		
MCBF Electric Life		100,000,000 pulses		
Wear Life		Paper feed length Approximately 50 Km		
Battery		1200 Cycles Rechargeable		
MSR		Auto 1/2/3 Track(Option)		
Dimensions (WxDxH)		78x125 x 46 mm(No MSR)		100x121 x 46 mm(No MSR)
		78 x132 x46 mm(With MSR)		100 x128 x46 mm(With MSR)
Weight		230g		280g

Chapter 11 Commands

11-1 Command List

No.	Command	Description	Hexadecimal Code	Page
1	HT	Horizontal tab	<09>	20
2	LF	Print and line feed	<0A>	20
3	FF		<0C>	20
4	CR	Print and carriage return	<0D>	20
5	CAN	Cancel print data in page mode	<18>	20
6	DLE EOT	Transmission real-time status	<10><04><n>	21
7	ESC FF	Print data in page mode	<1B><0C>	22
8	ESC SP	Set right-side character spacing	<1B><20><n>	22
9	ESC !	Select print mode(s)	<1B><21><n>	22
10	ESC $	Set absolute print position	<1B><24><nL><nH>	23
11	ESC *	Select bit image mode	<1B><2A><m><nL><nH>d1...dk	23
12	ESC -	Turn under line mode on/off	<1B><2D><n>	23
13	ESC 2	Select default line spacing	<1B><32>	24
14	ESC 3	Set line spacing	<1B><33><n>	24
15	ESC @	Initializing the printer	<1B><40>	24
16	ESC D	Set horizontal tab positions	<1B><44>n1...nK<00>	24
17	ESC E	Turn emphasized mode on/ off	<1B><45><n>	25
18	ESC G	Turn double-strike mode on/off	<1B><47><n>	25
19	ESC J	Print and feed paper	<1B><4A><n>	25
20	ESC L	Select page mode	<1B><4C>	25
21	ESC M	Select character font./MSR card read	<1B><4D><n>	25
22	EOT	Cancel card read mode	<04>	26
23	ESC S	Select standard mode	<1B><53>	27
24	ESC T	Select print direction in page mode	<1B><54><n>	27
25	ESC \	Set relative print position	<1B><5C><nL><nH>	27
26	ESC a	Select justification	<1B><61><n>	27
27	ESC d	Print and feed n lines	<1B><64><n>	28
28	ESC A	Set line spacing	<1B><41> <n>	28
29	ESC H	Select character Double-height mode	<1B><48><n>	28
30	ESC I	Select character Double-height mode	<1B><49>	28
31	ESC W	Defining the print area in page mode	<1B><57><xL>< xH>< yL><yH>< dxL>< dxH><dyL>< dyH>	29
32	ESC X	Select character Double-width mode	<1B><58><n>	30
33	ESC j	Print and feed paper	<1B><6A><n>	30
34	FS SO	Select character Double-width print mode	<1C><0E>	30
35	FS DC 4	Cancel character Double width print selection	<1C><14>	30
36	FS !	Select character print mode	<1C><21><n>	31
37	GS *	Define downloaded bit image	<1D><2A><n1><n2>d1...dk	31
38	GS /	Print downloaded bit image	<1D><2F><m>	32
39	GS !	Select character size	<1D><21><n>	33

No .	Command	Description	Hexadecimal Code	Page
40	GS $	Set absolute vertical print position in page mode	<1D><24><nL><nH>	33
41	GS (	Execute test print	<1D><28><41><pL><pH><n><m>	34
42	GS (		<1D><28><45><pL><pH><fn><d1><d2>	34
43	GS (		<1D><28><45><pL><pH><fn><d1><d2><d3>	35
44	GS (		<1D><28><45><pL><pH><fn>..	35
45	GS (		<1D><28><45><pL><pH><0B><a><d1><dk>	36
46	GS (		<1D><28><45><pL><pH><fn><a>	37
47	GS B	Turns white/black reverse printing mode on or off	<1D><42><n>	38
48	GS I	Transmits battery status	<1D><49><62>	38
49	GS I	Transmits printer ID	<1D><49><n>	39
50	GS L	Set left margin	<1D><4C><nL><nH>	40
51	GS W	Set printing area width	<1D><57><nL><nH>	40
52	GS \	Set relative vertical print position in page mode	<1D><5C><nL><nH>	40
53	GS f	Select font for HRI characters	<1D><66><n>	41
54	GS h	Selects bar code height	<1D><68><n>	41
55	GS k	Print bar code	(1)<1D><6B><m>d1...dk<NUL> (2)<1D><6B><m><n>d1...dn	41
56	GS r	Transmit status	<1D><72><n>	42
57	GS W	Set bar code width	<1D><77><n>	43

11-2 Control Commands

HT

[Name] Horizontal tab
[Format] ASCII HT
Hex 09
Decimal 9
[Description] Moves the print position to the next horizontal tab position.

LF

[Name] Print and feed line
[Format] ASCII LF
Hex 0A
Decimal 10
[Description]
- In standard mode, prints the data in the print buffer and feeds one line based on the current line spacing.
- In page move, modes the print position in memory to feed one line based on the current line spacing.

FF

[Name] If in page mode, after printing, the printer is returned to regular mode. If the label function is set, the paper is fed up to the next printing position.
[Format] ASCII FF
Hex 0C
Decimal 12
[Description]
- All data collected to the current point is printed, and then the printer is converted from page mode to regular mode.
- If the label function is set, the paper is fed up to the next printing position.

CR

[Name] Print and carriage return
[Format] ASCII CR
Hex 0D
Decimal 13
[Description] This command is ignored CR.

CAN

[Name] Cancel print data in page mode.
[Format] ASCII CAN
Hex 18
Decimal 24
[Description] In page mode, deletes all the print data in the current print area.

DLE EOT n

[Name] Transmission real-time status.
[Format] ASCII DLE EOT n
Hex 10 04 n
Decimal 16 4 n
[Range] 1 ≤ n ≤ 4
[Description] Transmits the status specified by n in real-time as follows:

n	Function
1	Transmit printer status.
4	Transmit paper roll sensor status.

- This printer transmits the following status in real time.

n=1: Printer status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed
1	On	02	2	Fixed
2	Off	00	0	Fixed
3	Off	00	0	On-Line
	On	08	8	Off-Line
4	On	10	16	Fixed
5	Off	00	0	Fixed
6	Off	00	0	Fixed
7	Off	00	0	Fixed

n=4: Continuous paper sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed
1	On	02	2	Fixed
2	Off	00	0	Fixed
3	Off	00	0	Fixed
4	On	10	16	Fixed
5,6	On	20	32	Paper end sensor: paper not present
	Off	00	0	Paper end sensor: paper present
7	Off	00	0	Fixed

[Notes]
- If print data includes a character string with this command, the printer performs this command. User must consider this.
  - Do not embed this command within another command.
  - For example : Bit image data might include this command.
  - This command is ignored block data is transmitted.

ESC FF

[Name] Print data in page mode.
[Format] ASCII ESC FF
Hex 1B 0C
Decimal 27 12
[Description] In page mode, prints all buffered data in the printing area collectively.

ESC SP n

[Name] Set right-side character spacing.
[Format] ASCII ESC SP n
Hex 1B 20 n
Decimal 27 32 n
[Range] 0 ≤ n ≤ 255
[Default] n=0
[Description]
- Sets the character spacing for the right side of the character to [n x horizontal or vertical motion units].
- The maximum right-side character spacing is: - 31.875mm.

ESC ! n

[Name] Select print mode(s).
[Format] ASCII ESC ! n
Hex 1B 21 n
Decimal 27 33 n
[Range] 0 ≤ n ≤ 255
[Default] n=0
[Description]
- Selects print mode(s) using n as follows.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (12 x 24) selected
1,2	Off	00	0	Reserved
3	Off	00	0	Emphasized mode not selected
	On	08	8	Emphasized mode selected
4	Off	00	0	Double-height mode not selected
	On	10	16	Double-height mode selected
5	Off	00	0	Double-width mode not selected
	On	20	32	Double-width mode selected
6	Off	00	0	Reserved
7	Off	00	0	Underline mode not selected
	On	80	128	Underline mode selected

ESC $ nL nH

[Name] Set absolute print position.
[Format] ASCII ESC $ nL nH
Hex 1B 24 nL nH
Decimal 27 36 nL nH
[Range] 0≤(nL + nH x 256)≤65535 (0≤nH≤ 255, 0 ≤nL≤255)
[Description]
- Sets the next print starting position, and the absolute print position, in reference to the left margin. The distance from the beginning of the line to the left margin is [(nL + nH x 256) x (vertical or horizontal motion units)].

ESC * m nL nH d1...dk

[Name] Select bit image mode.
[Format] ASCII ESC * m nL nH d1...dk
Hex 1B 2A m nL nH d1...dk
Decimal 27 42 m nL nH d1...dk
[Range] m=0, 1, 32, 33
1≤(nL + nH x 256)≤1023 (0≤nL≤ 255, 0 ≤nH≤3), 0≤d≤255
[Description]
- Specifies the bit image in m mode for the number of dots specified by nL and nH.
  * dpi : dots per 25.4mm {1" }

m	Mode	Vertical		Horizontal	Number of Data (K)
		Number of Dots	Dot Density (dpi)	Dot Density (dpi)	
0	8-dot single-density	8	60	90	nL + nH x 256
1	8-dot double-density	8	60	180	nL + nH x 256
32	24-dot single-density	24	180	90	(nL + nH x 256) x3
33	24-dot double-density	24	180	180	(nL + nH x 256) x3

ESC - n

[Name] Turn underline mode on/off.
[Format] ASCII ESC - n
Hex 1B 2D n
Decimal 27 45 n
[Range] 0≤n≤2, 48≤n≤50
n=0
[Description]
- Turn underline mode on or off, based on the following values of n :

n	Function
0, 48	Turns off underline mode
1, 49	Turns on underline mode, set at 1-dot width
2, 50	Turns on underline mode, set at 2-dot width

ESC 2

[Name] Select default line spacing.
[Format]
ASCII	ESC	2
Hex	1B	32
Decimal	27	50

[Description]
- The default line spacing is about 4.23 mm {1/6 inch}, which is equivalent to 30 dots.

ESC 3 n

[Name] Set line spacing.
[Format]
ASCII	ESC	3	n
Hex	1B	33	n
Decimal	27	51	n

[Range] $0 \leqslant n \leqslant 255$
[Description]
- The vertical or horizontal motion unit is approximately 0.125 mm {1/203 inches}. This value equals one dot pitch.
- Sets the current line spacing to [n x vertical motion units] inches.
- The maximum settable line spacing is 31.875 mm.

ESC @

[Name] Initialize printer.
[Format]
ASCII	ESC	@
Hex	1B	40
Decimal	27	64

[Range] $32 \leqslant n \leqslant 126$
[Description]
- Clears the data in the print buffer and resets the printer mode to the mode that was in effect when the power was turned on.

ESC D n1... nk NUL

[Name] Set horizontal tab positions.
[Format]
ASCII	ESC	D	n1...nk NUL
Hex	1B	44	n1... nk 00
Decimal	27	68	n1... Nk 0

[Range] $1 \leqslant n \leqslant 255, 0 \leqslant n \leqslant 32$
[Default] n=8, 16, 24, 32, 40,....., 232, 240, 248 (for font A in a standard character size width)
[Description]
- Sets horizontal tab positions.
  - n specifies the number of digits from the setting position to the left margin or the beginning of the line.
  - k specifies the number of bytes set for the horizontal tab position.

ESC E n

[Name] Turn emphasized mode on / off.
[Format]
ASCII	ESC	E	n
Hex	1B	45	n
Decimal	27	69	n

[Range] $1 \leqslant n \leqslant 255$
[Default] n=0
[Description]
- Turns emphasized mode on or off.
  - When the LSB of n is 0, emphasized mode is turned off.
  - When the LSB of n is 1, emphasized mode is turned on.

ESC G n

[Name] Turn double-strike mode on/off.
[Format]
ASCII	ESC	G	n
Hex	1B	47	n
Decimal	27	71	n

[Range] $1 \leqslant n \leqslant 255$
[Default] n=0
[Description]
- Turns double-strike mode on or off.
  - When the LSB of n is 0, double-strike mode is turned off.
  - When the LSB of n is 1, double-strike mode is turned on.

ESC J n

[Name] Print and feed paper.
[Format]
ASCII	ESC	J	n
Hex	1B	4A	n
Decimal	27	74	n

[Range] $1 \leqslant n \leqslant 255$
[Description]
- Prints the data in the print buffer and feeds the paper [n X vertical motion unit].

ESC L

[Name] Select page mode
[Format]
ASCII	ESC	L
Hex	1B	4C
Decimal	27	76

[Description] Switches from standard mode to page mode.

ESC M n

[Name] Select character font/MSR card read
[Format]
ASCII	ESC	M	n
Hex	1B	4D	n
Decimal	27	77	n

[Range] n = 0, 1, 48, 49, 67, 68, 69, 70, 71, 72, 73
[Default] n=0
[Description]
- Selects only-byte character fonts
- Selects Card reader mode

n	Function
0, 48	Character font A (12 x 24) selected.
70	Set 1 track card reader mode
71	Set 2 track card reader mode
72	Set 1,2 track card reader mode
73	Transmits the setting value(s) of the memory switch 7
67	Set 2 track card reader mode
68	Set 3 track card reader mode
69	Set 2,3 track card reader mode

Magnetic card read out put format

Track 1

02H 41H 31H 31H 1CH	DATA 76 characters	03H 0DH 0AH

Track 2

02H 42H 31H 31H 1CH	DATA 37 characters	03H 0DH 0AH

Track 1,2

02H 43H 31H 31H 1CH 1CH	DATA 76 characters	1CH	DATA 37 characters	03H 0DH 0AH

Track 3

02H 44H 31H 31H 1CH	DATA 104 characters	03H 0DH 0AH

Track 2,3

02H 45H 31H 31H 1CH 1CH	DATA 37 characters	1CH	DATA 104 characters	03H 0DH 0AH

Transmits the setting value output format

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	80H	128	1 byte
Data	30H ~ 37H	48 ~ 55	1 byte
NUL	00H	0	1 byte

EOT

[Name] Cancel card read mode
[Format] ASCII EOT
Hex 04
Decimal 4
[Description] • Cancel card read mode
• Works the same as when the POWER button is pressed

ESC S

[Name] Select standard mode.
[Format] ASCII ESC S
Hex 1B 53
Decimal 27 83
[Description] • Switches from page mode to standard mode. Any data stored in the printer for printing in page mode is cleared.

ESC T n

[Name] Select print direction in page mode.
[Format] ASCII ESC T n
Hex 1B 54 n
Decimal 27 84 n
[Range] 0≤n ≤3, 48≤n≤51
[Default] n=0
[Description] • Selects the print direction and starting position in page mode.

n	Print Direction	Starting Position
0,48	Left right	Upper left

ESC \ nL nH

[Name] Set relative print position.
[Format] ASCII ESC \ nL nH
Hex 1B 5C nL nH
Decimal 27 92 nL nH
[Range] 0≤(nL + nH x 256)≤65535 (0≤nL ≤255, 0≤nH≤255)
[Description] • Set the print starting position based on the current position to [(nL + nH X 256) X horizontal or vertical motion unit]
- When (nL + nH X 256) is positive number, the print starting position is specified to the right based on the current position.
- When (nL + nH X 256) is negative number, the print starting position is specified to the left based on the current position.

ESC a n

[Name] Select justification.
[Format] ASCII ESC a n
Hex 1B 61 n
Decimal 27 97 n
[Range] 0≤n ≤2, 48≤n≤50
[Default] n=0
[Description] • In standard mode, aligns all the data in one line to the position specified by n as follows :

n	Justification
0, 48	Left justification
1, 49	Centering
2, 50	Right justification

ESC d n

[Name] Print and feed n lines.
[Format]

ASCII	ESC	d	n
Hex	1B	64	n
Decimal	27	100	n

[Range] 0≤n≤255
[Description]
- Prints the data in the print buffer and feeds n lines.

ESC A n

[Name] Set line spacing
[Format]

ASCII	ESC	A	n
Hex	1B	41	n
Decimal	27	65	n

[Range] 0 ≤ n ≤ 255
[Description] Sets the line spacing to [n x vertical or horizontal motion unit].
[Details]
- The line spacing can be set independently in standard mode and in page mode.
- The maximum paper feed amount is 1016 mm {40"}. Even if a paper feed amount of more than 1016 mm {40"} is set, the printer feeds the paper only 1016 mm {40"}.

[Default] Approx 4.23mm {1/6"}.

ESC H n

[Name] Select character Double-height mode
[Format]

ASCII	ESC	H	n
Hex	1B	48	n
Decimal	27	72	n

[Range] 1 ≤ n ≤ 8
[Description] Select character Double-height mode.

ESC I

[Name] Select character Double-height mode
[Format]

ASCII	ESC	I
Hex	1B	49
Decimal	27	73

[Description] Select character Double-height mode.

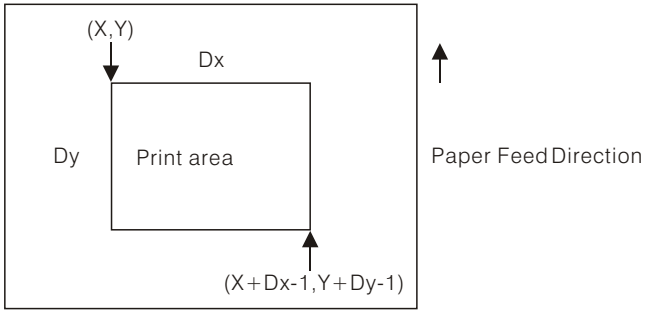
ESC W xL xH yL yH dxL dxH dyL dyH

[Name] Defining the print area in page mode
[Format]

ASC II	ESC	W	xL	xH	yL	yH	dxL	dxH	dyL	dyH
Hex	1B	57	xL	xH	yL	yH	dxL	dxH	dyL	dyH
Decimal	27	87	xL	xH	yL	yH	dxL	dxH	dyL	dyH

[Range] 0≤xL, xH, yL, yH, dxL, dxH, dyL, dyH≤255
[Description] Defines the location and size of the print area.
- Horizontal start point = [(xL + xH x 256) x basic calculation pitch] inches
- Vertical start point = [(yL + yH x 256) x basic calculation pitch] inches
- Horizontal length = [(dxL + dxH x 256) x basic calculation pitch] inches
- Vertical length = [(dyL + dyH x 256) x basic calculation pitch] inches

[Details]
- When standard mode is selected, this command only executes the internal flagging of the printer without affecting the printing in standard mode.
- If the horizontal start point or vertical start point is out of the printable area, this command is canceled and the next data is handled as normal data.
- If the horizontal length or vertical length is 0, this command is canceled and the next data is handled as normal data.
- If the "horizontal start point + horizontal length" is greater than the horizontal printable area, the "horizontal printable area - horizontal start point" is taken as the horizontal length.
- If the "vertical start point + vertical length" is greater than the vertical printable area, the "vertical printable area vertical start point" is taken as the vertical length.
- Fractions resulting from calculations are corrected with the minimum pitch of the mechanism, and the remainder are omitted.
- The horizontal start point and horizontal length are calculated with the basic calculation pitch (x). The vertical start point and vertical length are calculated with the basic calculation pitch (y).
- When the horizontal starting position , vertical starting position, printing area width, and printing area height are defined as X, Y, Dx, and Dy respectively, the printing area is set as shown in the figure below.



- This printable area for this printer is approximately 72.2 mm {512/180"} in the horizontal direction and approximately 117.3 mm {1662/360"} in the vertical direction.

[Default] XL = xH = yL = yH = 0
dxL = 0, dxH = 2, dyL = 126, dyH = 6

ESC X n

[Name] Select character Double-width mode
[Format]

ASCII	ESC	X	n
Hex	1B	58	n
Decimal	27	88	n

[Range] 1 ⩽ n ⩽ 8
[Description] Select character Double-width mode.

ESC j n

[Name] Print and feed paper
[Format]

ASCII	ESC	j	n
Hex	1B	6A	n
Decimal	27	106	n

[Range] 0 ⩽ n ⩽ 255
[Description] Prints the data in the print buffer and feed the paper [n x vertical or horizontal motion unit].
[Details]
- After printing is completed, this command sets the print starting position to the beginning of the line.
- The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.
- In standard mode, the printer uses the vertical motion unit (y).
- The maximum line spacing is 1016mm {40"}. When the setting value exceeds the maximum, it is converted to the maximum automatically.

FS SO

[Name] Select character Double-width print mode
[Format]

ASCII	FS	SO
Hex	1C	0E
Decimal	28	14

[Description] Select character Double-width print mode
This order can be canceled by FS, DC4, LF order.

FS DC 4

[Name] Cancel character Double width print selection
[Format]

ASCII	FS	DC4
Hex	1C	14
Decimal	28	20

[Description] This order can cancel character Double-width print mode set by FS, SO.

FS ! n

[Name] Select character print mode
[Format]

ASCII	FS	!	n
Hex	1C	21	n
Decimal	28	33	n

[Range] 0<n <255
[Description] Select print modes using n as follows

Bit	Off/On	Hex	Decimal	Function
0				Default font
1	-	-	-	Undefined
2	On	4	4	Double-height mode selected
3	On	8	8	Double-width mode not selected
4	--	-	-	Undefined
5	--	-	-	Undefined
6	--	-	-	Undefined
7	-	-	-	Undefined

If n is in the range of defination , this order can be neglected. When both double -height and double-width modes are selected, characters are printed simultaneously

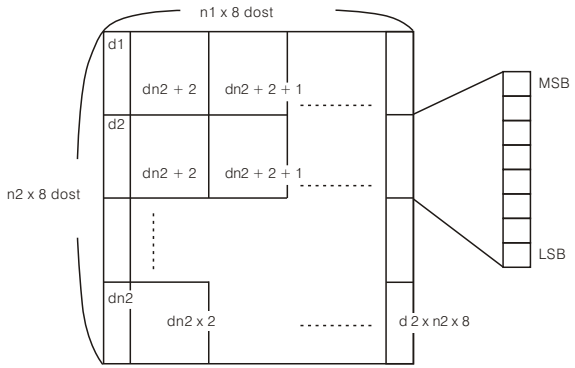
[Default] n=0.

GS * n1 n2 d1...d(n1 x n2 x 8)

[Name] Define downloaded bit image
[Format]

ASCII	GS	*	n1	n2	d1...d(n1 x n2 x 8)
Hex	1D	2A	n1	n2	d1...d(n1 x n2 x 8)
Decimal	29	42	n1	n2	d1...d(n1 x n2 x 8)

[Range] 1 ⩽ n1 ⩽ 255, 1 ⩽ n2 ⩽ 48, n1 x n2 ⩽ 1536 , 0 ⩽ d ⩽ 255
[Description] Defines a downloaded bit image using the number of dots specified by n1 and n2
-n1 specifies the number of dots in the horizontal direction.
-N2 specifies the number of dots in the vertical direction.
[Details]
- The number of dots in the horizontal direction is n1 x 8, in the vertical direction it is n2 x 8.
- If n1 x n2 is out of the specified range, this command is disabled.
- The d indicates bit-image data. Data (d) specifies a bit printed to 1 and not printed to 0.
- The downloaded bit image definition is cleared when:
  1. ESC @ is executed.
  2. Printer is reset or the power is turned off.
- The following figure shows the relationship between the downloaded bit image and the printed data.



[See Also] GS /

GS / m

[Name] Print downloaded bit image
[Format]

ASCII	GS	/	m
Hex	1D	2F	m
Decimal	29	47	m

[Range] 0 ⩽ m ⩽ 3, 48 ⩽ m ⩽ 51
[Description] Prints a downloaded bit image using the mode specified by m. Modes that can be selected by "m" are shown below.

m	Mode Name	Dot Density in Vertical Direction	Dot Density in Horizontal Direction
0,48	NORMAL MODE	203 DPI	203 DPI
1,49	DOUBLE WIDTH MODE	203 DPI	101 DPI
2,50	DOUBLE HEIGHT MODE	101 DPI	203 DPI
3,51	QUADRUPLE SIZE MODE	101 DPI	101 DPI

[Details]
- When data exists in the print buffer, this command is ignored.
- When a downloaded bit image has not been defined, this command is ignored.
- A portion of a downloaded bit image exceeding one line length is not printed.
- A downloaded character and a downloaded bit image cannot be defined simultaneously.

[See Also] GS *

GS ! n

[Name] Select character size.
[Format]

ASCII	GS	!	n
Hex	1D	21	n
Decimal	29	33	n

[Range] 1 ⩽ n ⩽ 255
(where 1⩽Enlargement in vertical direction⩽ 8, 1⩽ Enlargement in horizontal direction⩽ 8)
[Default] n=0
[Description]
- Selects character size (enlargement in vertical and horizontal directions).

Bit	Function	Setting
0	Specifies the number of times enlarged in the vertical direction	Refer to Table 2 [Enlarged in vertical direction]
1		
2		
3		
4	Specifies the number of times enlarged in the horizontal direction	Refer to Table 1 [Enlarged in horizontal direction]
5		
6		
7		

Table 1 Enlarged in horizontal direction

Hex	Decimal	Enlargement
00	0	1 time(Standard)
10	16	2 times
20	32	3 times
30	48	4 times
40	64	5 times
50	80	6 times
60	96	7 times
70	112	8 times

Table 2 Enlarged in vertical direction

Hex	Decimal	Enlargement
00	0	1 time(Standard)
01	1	2 times
02	2	3 times
03	3	4 times
04	4	5 times
05	5	6 times
06	6	7 times
07	7	8 times

GS $ nL nH

[Name] Set absolute vertical print position in page mode.
[Format]

ASCII	GS	$	nL nH
Hex	1D	24	nL nH
Decimal	29	36	nL nH

[Range] 0⩽(nL + nH x 256)⩽65535 (0⩽nL⩽255, 0⩽nH⩽255)
[Description]
- Sets the absolute vertical print starting position to [(nL + nH X 256)X (vertical or horizontal motion units)].

GS (A pL pH n m

[Name] Execute test print.

[Format]
ASCII GS (A pL pH n m
Hex 1D 28 41 pL pH n m
Decimal 29 40 65 pL pH n m

[Range] (pL + pH x 256) = 2 (pL=2, pH=0)
0≤n≤2, 48≤n≤50
1≤m≤3, 49≤m≤51

[Description]
- Executes a test print with a specified test pattern on a specified paper type (roll paper).

n specifies the paper type as listed below to be tested :

n	Paper type
0, 48	Paper roll
1, 49	
2, 50	

m specifies a test pattern as listed below :

m	Test pattern
1, 49	Hexadecimal dump
2, 50	Self Test Printing
3, 51	Self Test rolling pattern

[Notes]
- If this command is processed while a macro is being defined, the printer cancels macro definition and starts processing this command. At that time, the macro becomes undefined.
- After processing this command, the printer performs a software reset.

<Function 1> GS (E pL pH fn d1 d2 (fn=1)

[Format]
ASCII GS (E pL pH fn d1 d2
Hex 1D 28 45 pL pH fn d1 d2
Decimal 29 40 69 pL pH fn d1 d2

[Range] (pL + pH x 256) = 3 (pL=3, pH=0)
fn=1
d1=73, d2=78

[Description]
- Enter the user setting mode and notifies that the mode has changed.

	Hexadecimal	Decimal	Number of Data
Header	37H	55	1byte
Flag	20H	32	1byte
NUL	00H	0	1 byte

- The following commands are enabled in the user setting mode. <Function 2> through <Function 12> of GS (E, GS I.

<Function 2> GS (E pL pH fn d1 d2 d3 (fn=2)

[Format]
ASCII GS (E pL pH fn d1 d2 d3
Hex 1D 28 45 pL pH fn d1 d2 d3
Decimal 29 40 69 pL pH fn d1 d2 d3

[Range] (pL + pH x 256) = 4 (pL=4, pH=0)
fn=2
d1=79, d2=85, d3=84

[Description]
- Ends the user setting mode and performs a software reset. Therefore, the printer clears the data received in print buffers, and resets all settings (user-defined character, downloaded bit images, macros, and the print mode) to the mode that was in effect at powering on.
- This function code (fn=2) is enabled only in the user setting mode.

<Function 3> GS (E pL pH fn [a1 b18...b11]...[ak bk8...bk1] (fn=3)

[Format]
ASCII GS (E pL pH fn [a1 b18...b11]... [ak bk8...bk1]
Hex 1D 28 45 pL pH fn [a1 b18...b11]... [ak bk8...bk1]
Decimal 29 40 69 pL pH fn [a1 b18...b11]... [ak bk8...bk1]

[Range] 10 ≤ (pL + pH x 256) ≤65535
fn=3
a= 5

[Default] b=48, 49,50

[Description]
- All switches are set to Off (b=48).
- Change the memory switch specified by a to the values specified by b.
  - When b=48, the applicable bit is turned to Off.
  - When b=49, the applicable bit is turned to On.
  - When b=50, the applicable bit is not changed.

  When a=5 the memory switch 5 is set as follows :
  Set power off time (1~90 minute.) *When memory switch setting value 0, not work power off

MSW5-8	MSW5-7	MSW5-6	MSW5-5	MSW5-4	MSW5-3	MSW5-2	MSW5-1	Value
48	48	48	48	48	48	48	48	0
48	48	48	48	48	48	48	49	1
48	48	48	48	48	48	49	48	2
48	48	48	48	48	48	49	49	3
48	48	48	48	48	49	48	48	4
...	...	...	...	...	...	...	...	...
48	49	48	49	49	48	49	48	90

<Function 11> GS (E pL pH fn a d1...dk (fn=11)

[Format]

ASCII	GS	(	E	pL	pH	fn	a	d1 dk
Hex	1D	28	45	pL	pH	0B	a	d1 dk
Decimal	29	40	69	pL	pH	11	a	d1 dk

[Range] 3≤(pL + pHx 256)≤8 (3≤pL≤8,0≤ pH≤255)
fn=11, 1≤a ≤4
48≤d≤57 [a=1]
48≤d≤50 [a=2]
d=48,49 [a=3]
d=55,56 [a=4]
1≤k≤6

[Default] d1..dk= "19200" [a=1]
d=48[a=2]
d=48[a=3]
d=56[a=4]

[Description] sets the configuration item for the serial interface specified by a to the values specified by d1..dk

a	Configuration item
1	Transmission speed
2	Parity
3	Flow control
4	Data length

Transmission speed (a=1) is specified by number:

Example : When defining 19200 bps : 5bytes d1...dk "19200"
(Hexadecimal = 31H,39H,32H,30H,30H/Decimal= 49,57,50,48,48)

Parity (a=2) is specified by d as follows :

d	Function
48	Select no parity

Flow control(a=3) is specified by d as follows:

d	Function
48	Select Flow control DTR/DSR

Data Length(a=4) is specified by d as follows:

d	Function
56	Select 8bit length

<Function 12> GS (E pL pH fn a (fn=12)

[Format]

ASCII	GS	(	E	pL	pH	fn	a	
Hex	1D	28	45	pL	pH	fn	a	
Decimal	29	40	69	pL	pH	fn	a	

[Range] (pL + pHx 256) =2 (pL=2, pH=0)
fn=12, 1≤a≤4

[Description]
- Transmits the communication conditions of the serial interface specified by a.

a	Communication Condition
1	Baud rate
2	Parity
3	Flow control
4	Data length

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	33H	39	1 byte
Type of the Communication condition	31H - 34H	49-52	1 byte
Separator	1FH	31	1 byte
Setting value	30H - 39H	48 - 57	1 - 6 bytes
NUL	00H	0	1 byte

- Configuration of the setting value
  - When the baud rate (a=1) is specified :

Baud rate (bps)	d1	d2	d3	d4	d5	d6
2400	50	52	48	48	--	--
4800	52	56	48	48	--	--
9600	57	54	48	48	--	--
19200	49	57	50	48	48	--
38400	51	56	52	48	48	--
57600	53	55	54	48	48	--
115200	49	49	53	50	48	48

• When the parity setting (a=2) is specified :

d1	Parity
48	No parity (Fixed)

-When the flow control setting (a=3) is specified :

d1	Flow control
48	DTR / DSR (Fixed)

-When the data length setting (a=4) is specified :

d1	Data length
56	8 bits (Fixed)

• If a is out of range, this command ignores the value which is specified with a.

GS B n

[Name] Turns white/black reverse printing mode on / off.
[Format]

ASCII	GS	B	n
Hex	1D	42	n
Decimal	29	66	n

[Range] 0 ⩽ n ⩽ 255
[Default] n=0
[Description] • Turns white/black reverse printing mode on or off.
- When the LSB of n is 0, white/black reverse mode is turned off.
- When the LSB of n is 1, white/black reverse mode is turned on.

GS I b

[Name] Transmits battery status.
[Format]

ASCII	GS	I	b
Hex	1D	49	62
Decimal	29	73	98

[Description] Transmits the battery power status of the printer
[Notes] The transmitted battery status from this printer is constructed by [Header ~ NUL] as shown in the

Transmitted data	Hex	Decimal	Amount of data
Header	37H	55	1byte
Identifier	45H	69	1byte
Battery remaining	30h-34H	48-52	1byte
NUL	00H	0	1byte

"Battery remaining amount" is as indicated in the following table.

Battery remaining amount:

Hex	Decimal	Information
30H	48	Battery remaining amount : H level
31H	49	Battery remaining amount : M level
32H	50	Battery remaining amount : L level
33H	51	Battery remaining amount : S level
34H	52	Battery isn't installed

GS I n

[Name] Transmits printer ID.
[Format]

ASCII	GS	I	n
Hex	1D	49	n
Decimal	29	73	n

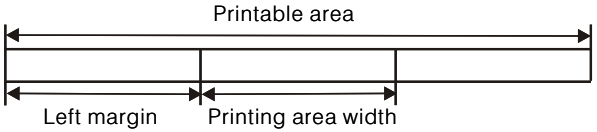
[Range] 65 ⩽ n ⩽ 69
[Description] • Transmits the printer ID specified.
- n specifies the printer information.

n	Printer ID type	ID
65	Firmware version	Depends on firmware version
66	Manufacturer	ZONERICH
67	Printer name	AB-320M/AB-330M
69	Font of Language for each country	Chinese : CHINA GB2312

GS L nL nH

[Name] Set left margin.
[Format]
ASCII	GS	L	nL	nH
Hex	1D	4C	nL	nH
Decimal	29	76	nL	nH

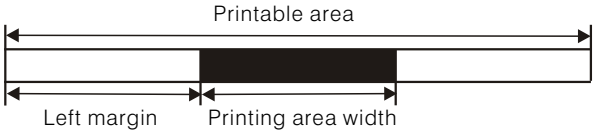
[Range] $1 \leqslant nL \leqslant 255, 0 \leqslant nH \leqslant 255$
$(nL + nH \times 256) = 0$ $(nL = 0, nH = 0)$
[Default]
[Description]
- Sets the left margin specified by nL and nH.
  - The left margin is [(nL + nH x 256) x (horizontal motion units)].



GS W nL nH

[Name] Set printing area width.
[Format]
ASCII	GS	W	nL	nH
Hex	1D	57	nL	nH
Decimal	29	87	nL	nH

[Range] $0 \leqslant nL \leqslant 255, 0 \leqslant nH \leqslant 255$
[Default] $(nL + nH \times 256) = 384$ $(nL = 128, nH = 1)$ (for 58mm of the paper width)
[Description]
- Sets the printing area width specified with nL and nH.
  - The printing area width is
    [(nL + nH x 256) x (horizontal motion units)].



GS \ nL nH

[Name] Set relative vertical print position in page mode.
[Format]
ASCII	GS	\	nL	nH
Hex	1D	5C	nL	nH
Decimal	29	92	nL	nH

[Range] $0 \leqslant nL \leqslant 255, 0 \leqslant nH \leqslant 255$
[Description]
- Sets the relative vertical print starting position from the current position in page mode. The distance from the current position to the starting position is
  [(nL + nH x 256) x (vertical or horizontal motion units)].

GS f n

[Name] Select font for HRI characters.
[Format]
ASCII	GS	f	n
Hex	1D	66	n
Decimal	29	102	n

[Range] For ANK/Multilingual model : n = 0, 1, 48, 49
[Default] n = 0
[Description]
- Selects a font for the HRI characters used when printing a bar code.
  - n specifies the font of the HRI characters as follows :

n	Font
0, 48	Font A (12 x 24)

GS h n

[Name] Selects bar code height.
[Format]
ASCII	GS	h	n
Hex	1D	68	n
Decimal	29	104	n

[Range] $1 \leqslant nL \leqslant 255$
[Default] n = 162
[Description]
- Selects the height of the bar code as n dots.

(1) GS k m d1...dk NUL
(2) GS k m n d1...dn

[Name] Print bar code
[Format]
(1) ASCII	GS	k	m	d1...dk	NUL
Hex	1D	6B	m	d1...dk	NUL
Decimal	29	107	m	d1...dk	NUL
(2) ASCII	GS	k	m	n	d1...dn
Hex	1D	6B	m	n	d1...dn
Decimal	29	107	m	n	d1...dn

[Range] (1) $0 \leqslant m \leqslant 6$ (k and d depend on the bar code system used)
(2) $65 \leqslant m \leqslant 73$ (n and d depend on the bar code system used)
[Description] Selects a bar code system and prints the bar code.

For (1) :

m	Bar Code System	Range of K	Range of d
2	JAN13 (EAN)	$12 \leqslant k \leqslant 13$	$48 \leqslant d \leqslant 57$
3	JAN 8 (EAN)	$7 \leqslant k \leqslant 8$	$48 \leqslant d \leqslant 57$
4	CODE39	$1 \leqslant k$	$48 \leqslant d \leqslant 57$, $65 \leqslant d \leqslant 90$, d = 32, 36, 37, 43, 45, 46, 47

For (2) :

m	Bar Code System	Range of k	Range of d
67	JAN13 (EAN13)	12 ≤ k ≤ 13	48 ≤ d ≤ 57
68	JAN 8 (EAN8)	7 ≤ k ≤ 8	48 ≤ d ≤ 57
69	CODE39	1 ≤ k≤255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, d=32, 36, 37, 43, 45, 46, 47
73	CODE128	2 ≤ k≤255	0 ≤ d ≤ 127

[Notes] User most consider the quiet zone of the bar code (left and right spaces of the bar code)

GS r n

[Name] Transmit status.
[Format]

ASCII	GS	r	n
Hex	1D	72	n
Decimal	29	114	n

[Range] n=1,2,49,50
[Description]
- Transmits the normal status specified by n as follows :

n	Function
1, 49	Transmits paper sensor status.

- Paper sensor status (n=1, 49) :

Bit	Off/On	Hex	Decimal	Function
0,1	Off	00	0	Paper roll near-end sensor : paper adequate. (Fixed)
2,3	Off	00	0	Paper roll end sensor : paper present
	On	0C	12	Paper roll end sensor : paper not present
4	Off	00	0	Fixed
5	Off	00	0	Reserved
6	Off	00	0	Reserved
7	Off	00	0	Fixed

- Bits 2 and 3 : This command cannot be executed since the printer becomes offline when the paper roll end sensor detects the paper not present. Therefore, the status of bit 2 (1) and bit 3 (1) is not transmitted.

GS W n

[Name] Set bar code width.
[Format]

ASCII	GS	w	n
Hex	1D	77	n
Decimal	29	119	n

[Range] 2≤n≤ 6,n=3
[Description]
- Set the horizontal size of the bar code, using n as follows :

n	Multi-level Bar Code	Binary-level Bar Code	
	Module Width (mm)	Thin element width (mm)	Thick element width (mm)
2	0.282	0.282	0.706
3	0.423	0.423	1.129
4	0.564	0.564	1.411
5	0.706	0.706	1.834
6	0.847	0.847	2.258

[Notes]
- Multi-level bar codes are as follows :
  - UPC-A, UPC-E, JAN13, HAN8, CODE93, CODE128
- Binary-level bar codes are as follows :
  -CODE39, ITF, CODABAR